

TITLE OF THE INVENTION

SYSTEM AND METHOD FOR KEEPING CONSUMABLE ITEMS  
IN AN IMAGE FORMING APPARATUS

CROSS REFERENCE TO RELATED APPLICATIONS

5 This application claims priority under 35 USC §119 to Japanese Patent Application No. 11-204774 filed on July 19, 1999, the entire contents of which are incorporating reference herein.

BACKGROUND OF THE INVENTIONField of the invention

10 The present invention relates in general to a system and method for keeping consumable items, such as sheets and toner in an image forming apparatus, such as a copier, a facsimile and a printer.

Discussion of the Background

15 A conventional image forming apparatus generally stops its operation when running low on a consumable item when the consumable item is not promptly replenished. In a modern automated office, the business of the office can considerably be influenced when an image forming apparatus is even briefly out of operation. Then, to promptly replenish consumable items, the Japanese Patent Application Laid Open Number 11-3005 proposes a copier kept supplied with consumable items by providing the copier with a communication  
20 function and connecting the copier with a host computer via a communication circuit. In fact, it is indeed possible to constitute a system for keeping consumable items by using the above-mentioned copier having a communication function.

25 However, it is impossible to constitute a system capable of executing inventory control of consumable items at a user side if no communication function is provided. In that case, the image forming apparatus does not operate in the case when its display indicates a shortage of a consumable item and the consumable item is not replenished.

Further, a working down time is continued until consumable items are delivered after a user has ordered replenishment.

### SUMMARY OF THE INVENTION

Accordingly, an object of the present invention is to provide a novel consumable item keeping method and system in which supply of consumable items are maintained and down time due to consumable item depletion is reduced. To that end, the present invention provides a consumable item keeping method and system wherein a consumable item keeping apparatus stores a variety of consumable items at a user side, a consumable item supplying section is connected to the consumable item keeping apparatus via a communication device and supplies a variety of consumable items to a user upon request, a consumable item replenishment level setting device sets a consumable item replenishment level for the consumable item keeping apparatus, a consumable item replenishment signal generating device generates a signal indicative of arrival of the consumable items at the consumable item replenishment level, and a consumable item order data transmitting device transmits via the communication circuit order data indicating a request for consumable items to be replenished to the consumable item supplying section, when the consumable item replenishment signal is generated.

According to the present invention, a user can optionally set a consumable item replenishment level.

Further according to the present invention, a kind of the consumable items arriving at the consumable item replenishment level is detected and its data is included in the order data.

Further according to the present invention, the order data is transmitted only when said signal is continuously sensed for a prescribed time period.

Further according to the present invention, the order data is reset when the signal disappears before a prescribed time period has elapsed.

~~Further according to the present invention, a data-receiving device configured to receive the order data transmitted from the order data transmitting device is provided in the consumable item supplying section.~~

Further according to the present invention, a determining device configured to determine both a kind and a amount of consumable items to be distributed from the consumable item supplying section to a user according to the order data is provided in the consumable item supplying section.

Further according to the present invention, a delivery data transmitting device

configured to transmit delivery data of the consumable item to be distributed is provided in the consumable item supplying section.

Further according to the present invention, the delivery data includes information of a day when consumable item distribution is commenced by the consumable item supplying section.

Further according to the present invention, the delivery data includes information of a day when consumable item is scheduled to be delivered to a user.

Further according to the present invention, the consumable item is used in an image forming apparatus installed in a user side.

Further according to the present invention, the communication circuit includes a wireless system.

Further according to the present invention, the inventory-detecting device is employable regardless of a model and manufacturer of the image forming apparatus.

Further according to the present invention, the delivery data is displayed on a display at the user side.

#### BRIEF DESCRIPTION OF THE DRAWINGS

A more complete appreciation of the present invention and many of the attendant advantages thereof will be readily obtained as the same becomes better understood by the following detailed description when considered in connection with the accompanying drawings, wherein:

Fig. 1 is a schematic block diagram illustrating a consumable item keeping system of one embodiment of the present invention;

Fig. 2 is a flowchart illustrating one example of an operational procedure for dealing consumable item order data;

Fig. 3 is a diagram illustrating one example of contents of consumable item order data; and

Fig. 4 is a diagram illustrating one example of contents of delivery data transmitted from a consumable item-supplying center.

### DESCRIPTION of THE PREFERRED EMBODIMENTS

Referring now to the drawing, wherein like reference numerals designate identical or corresponding parts throughout several views, and more particularly to Fig. 1 thereof, Fig. 1 is a schematic block diagram illustrating a consumable item keeping system according to one embodiment of the present invention. The consumable item keeping system includes a consumable item keeping apparatus 10, a communication circuit 30, a consumable item supplying section 80, a plurality of consumable item replenishment level detecting sensors S1 and S2, a plurality of (sheet) size detecting sensors S3 and S4, and stacks of different sized sheets, such as A4 and A3 standard sheets. A side guide plate 12, a display 14, and a CPU (Central Processing Unit) 16 are also included.

Further, a MODEM (Modulation/Demodulation) M1, a PSU (Power Supply Unit) 18, and an AC (power supply) 20 are also included. The consumable item replenishment level detecting sensors S1 and S2 can be photo-sensors (a distance detecting type and a reflection detecting type or the like), pressure sensors, or micro-switches or the like.

The consumable item replenishment level, e.g., a position of the sensor, can be preset at a prescribed value when a consumable item keeping apparatus is initially installed. A user can adjust the position of the sensor, so that a level of replenishment can be adjusted corresponding to intent of the user. Accordingly, as consumable items reach a consumable item replenishment level, namely a remaining amount decreases to a prescribed level, a signal indicative of replenishment of consumable items is generated and transmitted to the CPU 16.

Sheet size detecting sensors S3 and S4 may also be photo-sensors (a distance-detecting type and a reflection-detecting type or the like). The sheet size detecting sensors S3 and S4 may detect the width of consumable items at a position where the side guide plate 12 is attached, and may transmit size data to the CPU 16. A user can move and adjust the side guide plate 12 at a prescribed position to match it with the width of the consumable items. Thus, the side guide plate 12 may function to secure the consumable item at a prescribed position. The display 14 may display consumable item ordering day and time, and delivery day and time, so that the user can use the information when confirming a delivery status. A liquid crystal type display panel can be utilized as the display 14.

The CPU 16 may monitor both inventory state data and order/delivery data. As a monitoring operation, the CPU 16 may determine that consumable item is required and

transmit consumable item order data to M1, when continuously receiving a consumable item replenishment signal for a prescribed detection time period from one of the sensors S1 and S2. A user can optionally set such a detecting time period. At that time, the CPU 16 may detect size data and an ordering amount of the consumable item sent from the sensors S3 and S4.

Since types of consumable item may be related to the sensors S1 and S2, the type of the consumable item to be replenished can be determined based on the consumable item replenishment signal sent from the sensors S1 and S2. The CPU 16 may generate a user list with user code. To monitor order/delivery data, both order data and delivery data are monitored and displayed on the display 14. The MODEM (Modulation/Demodulation) M1 may transfer the order data of the consumable item receiving from the CPU 16, acting as a communication control section, toward the communication circuit 30.

The consumable item supplying section 80 may be provided with a PC (personal computer) 82 and a MODEM M2, may have a service person deliver consumable items to a user based on order data, and may automatically transmit data of scheduled delivery to the user. The PC 82 may be a consumable item supplying section host computer, and may give the service person delivery instructions specifying a type and size of the consumable items and user code when receiving the order data of the consumable items. Further, it may transmit the delivery data to the MODEM 2, which may transmit the delivery data from the consumable item supplying section 80 to the communication circuit 30. The communication circuit 30 may utilize either a private use line or a public circuit network including a wireless circuit, such as a PHS (Personal Phone System).

Since the consumable item keeping apparatus 10 may be a private use apparatus, it can be applied regardless of a model and a manufacturer to an image forming apparatus, such as a copier, a facsimile, a printer and a duplicator, of a user.

An example of contents of order data used in the consumable item keeping apparatus 10 when monitoring both inventory status data and order/delivery data is illustrated in Fig. 3. The data may include day and time when order data is transmitted, user code as user information monitored by the CPU 16, information of a consumable item type also monitored by the CPU 16, size information of consumable items sent from the size detecting sensors S3 and S4, and information of an ordering amount of the consumable item.

Delivery data transmitted from the consumable item supplying section 80 are illustrated in Fig. 4. The data may include consumable item distribution day and time when distribution of consumable item to a user is commenced and delivery data indicating information of scheduled delivery date to a user.

5 A procedure for dealing consumable item order data is now described referring to Fig. 2. Firstly, when inventory decreases from its initial condition as shown in step S10 and reaches the replenishment level, a consumable item-replenishment signal may be generated and transmitted by the consumable item replenishment level detecting sensor S1 to the CPU 16. The CPU 16 may then transmit consumable item order data to the consumable item  
10 supplying section 80 via the communication circuit 30, when the consumable item replenishment signal has been continuously sensed more than a prescribed time period set by a user (i.e., Yes in step S12).

If it is less than the time period (i.e., No in step S12), the order data may be reset in step S13 because it is recognized that the signal is erroneously generated and the consumable  
15 item inventory has not yet reached the replenishment level. The consumable item supplying section 80 having received the order data may deliver the applicable consumable items to the applicable user and transmit delivery data to the consumable item keeping apparatus 10 via the communication circuit 30.

The consumable item keeping apparatus 10 having received the delivery data may  
20 display the delivery data on the display 14 to notify the user. Thus, the user can confirm the delivery status through the display 14 by viewing the order day, the scheduled delivery day and the distribution day, and is capable of reminding the consumable item supplying section.

Numerous modifications and variations of the present invention are possible in light  
25 of the above teachings. It is therefore to be understood that within the scope of the appended claims, the present invention may be practiced otherwise than as specifically described herein.